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Population status of the Illinois chorus frog (*Pseudacris streckeri illinoensis*) in Madison County, Illinois: Results of 2004 surveys

IDOT CONTRACT 1-5-90179

FINAL REPORT ON 2004 RESULTS

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DISCLAIMER

The findings, conclusions, and views expressed herein are those of the researchers and should not be considered as the official position of the Illinois Department of Transportation.

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EXECUTIVE SUMMARY

A study of the biology of the Illinois chorus frog, *Pseudacris streckeri illinoensis*, is reported. Surveys of Madison County for choruses of the frogs located two choruses in 2004. These choruses were active at two of the same sites that choruses were found in 2002. The bulk of the study was conducted using drift fences at the wetland mitigation area adjacent to Sand Road in Sec. 19, T4N, R8W. The primary purpose of the 2004 study was to estimate population size and density at the mitigation area. No estimates could be made for 2004 because only a three unmarked frog was caught in a chorus at the study area. The lack of large (> 3 cm) rainfall events likely explain the inactivity.

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INTRODUCTION

The Illinois chorus frog, *Pseudacris streckeri illinoensis*, is restricted to the floodplains of the Mississippi and Illinois rivers in Arkansas, Illinois, and Missouri (Conant and Collins, 1991). The frog is listed as a threatened species in Illinois (Herkert, 1992), as a rare species in Missouri (Anonymous, 1992), as a species of special concern in Arkansas (R. Roberg, pers. comm.), and as federal C-2 species (Dodd et al., 1985).

This highly fossorial frog occurs in Illinois mainly along the central part of the Illinois River (Smith, 1951, 1961, 1966; Morris and Smith, 1981; Taubert et al., 1982; Brown and Rose, 1988; Morris, 1990; Beltz, 1991 and 1993). Other populations are, also, scattered along the Mississippi River from Madison to Alexander Counties, Illinois (Holman et al., 1964; Brown and Brown, 1973; Axtell and Haskell, 1977; Morris and Smith, 1981; Taubert et al., 1982; Gilbert, 1986; Brown and Rose, 1988; Morris, 1990; Beltz, 1991 and 1993; Tucker and Philipp, 1993; 1994; 1995; 1996).

Several previous publications and unpublished reports provide details on the life history of *P. s. illinoensis* including information on underground feeding behavior (Brown, 1978), burrowing behavior (Axtell and Haskell, 1977; Brown et al., 1972; Tucker et al., 1995; Tucker, 1995), chorus sites (Brown and Rose, 1988; Tucker, 1998), fecundity (Butterfield et al., 1989; Tucker and Philipp, 1995; Tucker, 1997a), post-metamorphic growth (Tucker, 1995; Tucker and Philipp, 1995), morphology of newly transformed froglets (Tucker, 1997b); food habits (Tucker, 1997c), thermobiology (Packard et al.. 1998), and

morphological adaptations to fossorial existence (Brown and Means, 1984; Paukstis and Brown, 1987 and 1991). The present report is a summary of results for 2002 and a continuation of studies initiated in 1993.

This year's activities carried forward objectives from previous years and include an analysis of the impact of the wetland mitigation area. My objectives were:

1. Monitor the distribution of *P. s. illinoensis* choruses in appropriate habitat in the impact area.
2. Estimate the approximate number of *P. s. illinoensis* located on the wetland mitigation area.

CHORUS LOCATIONS IN THE SAND ROAD STUDY AREA

MATERIALS AND METHODS

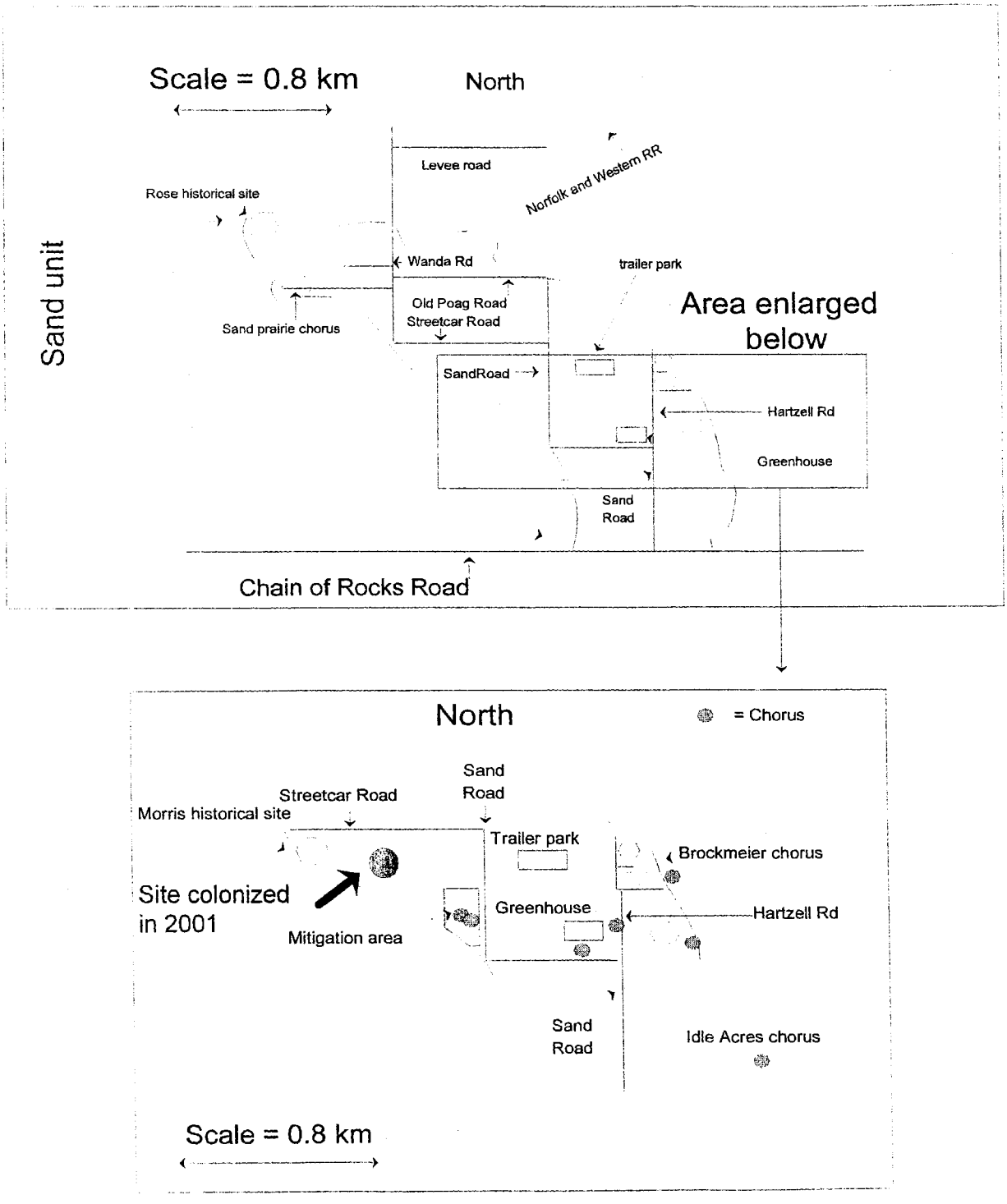
Monitoring of chorus locations in the Sand Road study area (Fig. 1) began on February 05, 2004. The methods used and sites visited were reviewed in previous reports (i.e., Tucker and Philipp, 1996).

RESULTS AND DISCUSSION

In 2004, two choruses were found. In contrast, in the previous year (2003) no choruses were found. However, in other years, a total of nine choruses were located (Fig. 1). No new chorus sites were found in 2004.

Figure 1. Sand Road study area showing the location of the wetland mitigation area and known choruses of the Illinois chorus frog (*Pseudacris streckeri illinoensis*) in Madison County, Illinois.

Figure 1


Scale = 0.8 km
North
Levee road
Norfolk and Western RR
Rose historical site
Sand unit
Wanda Rd
trailer park
Old Poag Road
Streetcar Road
Sand prairie chorus
Area enlarged below
SandRoad
Hartzell Rd
Greenhouse
Sand Road
Chain of Rocks Road
North
= Chorus
Sand Road
Streetcar Road
Morris historical site
Trailer park
Brockmeier chorus
Site colonized in 2001
Greenhouse
Hartzell Rd
Mitigation area
Sand Road
Idle Acres chorus
Scale = 0.8 km

Generally, chorus sites have been stable in the general study area from 1994-2002 with no indication of decline. This year's results and those of 2003 marked a departure from past years results with the discovery of no or minimal chorus activity. The likely cause was lack of large rainfall events in 2003 and 2004.

POPULATION SIZE ESTIMATES

MATERIALS AND METHODS

Population size estimate would have been computed using the Petersen method as modified by Bailey (1951) for estimates of population size when number of recaptures were small (Donnelly and Guyer, 1994). Standard error of was not calculated due to the small number of captures in 2000, 2001, 2002.

RESULTS AND DISCUSSION

Petersen estimate of population size was not possible in 2004. Only a three adult males were caught following a rain event on 15 March 2004. These frogs were caught in a chorus at the mitigation site during the night time hours. No frogs were caught in the drift fences suggesting that frog activity was minimal or that populations are seriously depressed. Apparently the absence of large rainfall events kept frogs from attempting to travel to chorusing sites. A similar pattern was observed in 2000 and 2003.

Table 1. Number of Illinois chorus frogs caught on drift fences from 1996 to 2004.

Year	Total number of frogs	males	females
1996	60	31	29
1997	86	47	39
1998	22	13	9
1999	151	78	73
2000	2	0	2
2001	12	5	7
2002	47	24	23
2003	1	0	1
2004	0	0	0

Summary

The restored wetland actually became available for the frogs to use in 1998. Coincidentally, 1997 was a severe drought year and the number of frogs caught in the following year (1998) was reduced by one-quarter in that compared to previous years. Despite this reduction, captures in 1999 were the highest ever made. These capture rates are not affected by collecting effort because the same drift fences have been used in all years of the study since 1996.

The 2004 year represents the lowest capture rate for any year of the study at the wetland mitigation area. Like 2003, 2004 was an extremely dry spring. Presumably that explains the lack of frog activity in 2004. The decreased activity of frogs was also noted in other Illinois populations including ones in Cass, Morgan, and Scott Counties. Frogs were only caught in two choruses. Three were recovered from the mitigation area and five from the Brockmeyer site nearby. One of the Brockmeyer frogs was marked in 1999 all others were new captures.

The question that remains to be determined is "how successful is the wetland mitigation project in maintaining the Illinois chorus frog in Madison County?". This question cannot be fully answered at this time. A worrisome trend is apparent in the data collected to date continues. The lowest total numbers of frogs caught are all post-1999 (Table 1). The wetland actually became avaiable for the frogs to use in 1998 and possibly they were able to use it with extreme success, which is reflected in the high 1999 totals.

However, the wetland is also home for a number of potential frog tadpole predators including the tiger salamander (*Ambystoma tiginum*) and

various fish. One possible hypothesis to explain low post-1999 frog numbers is that the wetland also allowed numbers of tiger salamanders to increase greatly. It is noteworthy that more than 300 salamanders were caught transforming in 1999. The wetland provided a stable water source for these animals to complete their life cycle where one had not been present before. This is important because tiger salamanders need open water for about one month longer than does the Illinois chorus frog.

Fish are also another possible predator. The more persistent nature of the wetland may have contributed to fish success. Fish have been present in the wetland in all years except 2000. In that year the dry summer and fall allowed the wetland to completely dry out killing estabished fish populations. The fish "problem" is caused by repeated flooding from the County Ditch into the wetland.

Data collected (number of frogs caught/year-Table 1) does not support the conclusion that the wetland has been a success so far as the Illinois chorus frog is concerned. In fact, mean number of frogs caught from 2000-2004 is 12.4 frogs compared to an average of 56 frogs per year between 1996-1998. This continues to suggest that frog numbers have been reduced by 360% at the study site in post-1999 surveys.

The question remains as to why this apparent reduction in frog numbers has occurred. It could be that numbers reflect poor spring weather in 2000, 2003, and 2004.

Assuming that lack of rainfall is the reason for low frog numbers in the drift fence does not take into consideration that frog breeding and recruitment has been essentially stopped for three of the past five years. Thus management strategy at the site needs to be carefully

addressed. Unfortunately, the monitoring of this site is being dicontinued. Without continued spring time monitoring and intensive management frogs may well be lost at this Madison County site.

Management initiatives to reduce salamander success and fish occupation of the site may be the only hope for the continued survival of this population. Draining the wetland by opening the gate on the berm on June 1 should to be started. Allowing the wetland to dry down during June would greatly reduce salamander breeding success but not affect the Illinois chorus frog. Studies examining the number of salamanders at the site would also be indicated. Continued spring time monitoring is necessary to properly fulfill the mandate to mitigate loss of wetlands used by the Illinois chorus frog for breeding during construction of Illinois route 255.

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